

PATENT COOPERATION TREATY

UPF
JLK

From the INTERNATIONAL SEARCHING AUTHORITY

To:
PETER J. FASSE
FISH & RICHARDSON P.C.
225 FRANKLIN STREET
BOSTON, MA 02110-2804

PCT

NOTIFICATION OF TRANSMITTAL OF THE INTERNATIONAL SEARCH REPORT OR THE DECLARATION

(PCT Rule 44.1)

| | |
|---|---|
| Applicant's or agent's file reference 07917-166WO1 | Date of Mailing (day/month/year) 6.21.04 |
| International application No. PCT/US03/07323 | International filing date (day/month/year) 07 March 2003 (07.03.2003) |
| Applicant UNIVERSITY OF MASSACHUSETTS | |

1. ☒ The applicant is hereby notified that the international search report has been established and is transmitted herewith.

Filing of amendments and statement under Article 19:

The applicant is entitled, if he so wishes, to amend the claims of the international application (see Rule 46):

When? The time limit for filing such amendments is normally two months from the date of transmittal of the international search report.

Where? Directly to the International Bureau of WIPO, 34, chemin des Colombettes
1211 Geneva 20, Switzerland, Facsimile No.: (41-22) 740.14.35

For more detailed instructions, see the notes on the accompanying sheet.

2. ☐ The applicant is hereby notified that no international search report will be established and that the declaration under Article 17(2)(a) to that effect is transmitted herewith.
3. ☐ With regard to the protest against payment of (an) additional fee(s) under Rule 40.2, the applicant is notified that:
- ☐ the protest together with the decision thereon has been transmitted to the International Bureau together with the applicant's request to forward the texts of both the protest and the decision thereon to the designated Offices.
- ☐ no decision has been made yet on the protest; the applicant will be notified as soon as a decision is made.

4. **Reminders**

Shortly after 18 months from the priority date, the international application will be published by the International Bureau. If the applicant wishes to avoid or postpone publication, a notice of withdrawal of the international application, or of the priority claim, must reach the International Bureau as provided in Rules 90 bis.1 and 90 bis.3, respectively, before the completion of the technical preparations for international publication.

Within 19 months from the priority date, but only in respect of some designated Offices, a demand for international preliminary examination must be filed if the applicant wishes to postpone the entry into the national phase until 30 months from the priority date (in some Offices even later); otherwise the applicant must, within 20 months from the priority date, perform the prescribed acts for entry into the national phase before those designated Offices.

In respect of other designated Offices, the time limit of 30 months (or later) will apply even if no demand is filed within 19 months.

See the Annex to Form PCT/IB/301 and, for details about the applicable time limits, Office by Office, see the *PCT Applicant's Guide*, Volume II, National Chapters and the WIPO Internet site.

Name and mailing address of the ISA/US
Mail Stop PCT, Attn: ISA/US
Commissioner for Patents
P.O. Box 1450
Alexandria, Virginia 22313-1450
Facsimile No. (703)305-3230

Authorized officer
Zachariah Lucas
Telephone No. 703/308-0196

Form PCT/ISA/220 (April 2002)

(See notes on accompanying sheet)

Docketed By Practice Systems
Search Report due 8.21.04
Foreign Art due 9.21.04
(116601 - Abandoned)
Initials: NML

Docketed By Billing Secretary
Due Date: 8.21.04
Deadline: 8/20/04
Initials: HAM

RECEIVED

JUN 23 2004

FISH & RICHARDSON, P.C.

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PATENT COOPERATION TREATY

From the INTERNATIONAL SEARCHING AUTHORITY

To:
PETER J. FASSE
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225 FRANKLIN STREET
BOSTON, MA 02110-2804

PCT

NOTIFICATION OF TRANSMITTAL OF THE INTERNATIONAL SEARCH REPORT OR THE DECLARATION

(PCT Rule 44.1)

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|---|---|
| Applicant's or agent's file reference 07917-166WO1 | Date of Mailing (day/month/year) 21 JUN 2004 |
| International application No. PCT/US03/07323 | International filing date (day/month/year) 07 March 2003 (07.03.2003) |
| Applicant UNIVERSITY OF MASSACHUSETTS | |

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Within 19 months from the priority date, but only in respect of some designated Offices, a demand for international preliminary examination must be filed if the applicant wishes to postpone the entry into the national phase until 30 months from the priority date (in some Offices even later); otherwise the applicant must, within 20 months from the priority date, perform the prescribed acts for entry into the national phase before those designated Offices.

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See the Annex to Form PCT/IB/301 and, for details about the applicable time limits, Office by Office, see the *PCT Applicant's Guide*, Volume II, National Chapters and the WIPO Internet site.

Name and mailing address of the ISA/US
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Facsimile No. (703)305-3230

Authorized officer

Zachariah Lucas

Telephone No. 703/308-0196

Form PCT/ISA/220 (April 2002)

(See notes on accompanying sheet)

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PATENT COOPERATION TREATY

PCT

INTERNATIONAL SEARCH REPORT

(PCT Article 18 and Rules 43 and 44)

| | | |
|---|---|---|
| Applicant's or agent's file reference 07917-166WO1 | FOR FURTHER ACTION | see Notification of Transmittal of International Search Report (Form PCT/ISA/220) as well as, where applicable, item 5 below. |
| International application No. PCT/US03/07323 | International filing date (<i>day/month/year</i>) 07 March 2003 (07.03.2003) | (Earliest) Priority Date (<i>day/month/year</i>) 08 March 2002 (08.03.2002) |
| Applicant UNIVERSITY OF MASSACHUSETTS | | |

This international search report has been prepared by this International Searching Authority and is transmitted to the applicant according to Article 18. A copy is being transmitted to the International Bureau.

This international search report consists of a total of 5 sheets.

☒ It is also accompanied by a copy of each prior art document cited in this report.

1. Basis of the Report

a. With regard to the language, the international search was carried out on the basis of the international application in the language in which it was filed, unless otherwise indicated under this item.

☐ the international search was carried out on the basis of a translation of the international application furnished to this Authority (Rule 23.1(b)).

b. With regard to any nucleotide and/or amino acid sequence disclosed in the international application, the international search was carried out on the basis of the sequence listing:

☐ contained in the international application in written form.

☐ filed together with the international application in computer readable form.

☐ furnished subsequently to this Authority in written form.

☐ furnished subsequently to this Authority in computer readable form.

☐ the statement that the subsequently furnished written sequence listing does not go beyond the disclosure in the international application as filed has been furnished.

☐ the statement that the information recorded in computer readable form is identical to the written sequence listing has been furnished.

2. ☐ Certain claims were found unsearchable (See Box I).

3. ☒ Unity of invention is lacking (See Box II).

4. With regard to the title,

☒ the text is approved as submitted by the applicant.

☐ the text has been established by this Authority to read as follows:

5. With regard to the abstract,

☒ the text is approved as submitted by the applicant.

☐ the text has been established, according to Rule 38.2(b), by this Authority as it appears in Box III. The applicant may, within one month from the date of mailing of this international search report, submit comments to this Authority.

6. The figure of the drawings to be published with the abstract is Figure No. _____

☐ as suggested by the applicant.

☐ because the applicant failed to suggest a figure.

☐ because this figure better characterizes the invention.

☒ None of the figures

INTERNATIONAL SEARCH REPORT

International application No.

PCT/US03/07323

Box I Observations where certain claims were found unsearchable (Continuation of Item 1 of first sheet)

This international report has not been established in respect of certain claims under Article 17(2)(a) for the following reasons:

1. ☐ Claim Nos.:
because they relate to subject matter not required to be searched by this Authority, namely:
2. ☐ Claim Nos.:
because they relate to parts of the international application that do not comply with the prescribed requirements to such an extent that no meaningful international search can be carried out, specifically:
3. ☐ Claim Nos.:
because they are dependent claims and are not drafted in accordance with the second and third sentences of Rule 6.4(a).

Box II Observations where unity of invention is lacking (Continuation of Item 2 of first sheet)

This International Searching Authority found multiple inventions in this international application, as follows:
Please See Continuation Sheet

1. ☐ As all required additional search fees were timely paid by the applicant, this international search report covers all searchable claims.
2. ☐ As all searchable claims could be searched without effort justifying an additional fee, this Authority did not invite payment of any additional fee.
3. ☐ As only some of the required additional search fees were timely paid by the applicant, this international search report covers only those claims for which fees were paid, specifically claims Nos.:
4. ☒ No required additional search fees were timely paid by the applicant. Consequently, this international search report is restricted to the invention first mentioned in the claims; it is covered by claims Nos.: 1-6, and 24-34

Remark on Protest

☐
☐

The additional search fees were accompanied by the applicant's protest.

No protest accompanied the payment of additional search fees.

INTERNATIONAL SEARCH REPORT

International application No.

PCT/US03/07323

A. CLASSIFICATION OF SUBJECT MATTER

IPC(7) : C12N 7/01

US CL : 435/235.1

According to International Patent Classification (IPC) or to both national classification and IPC

B. FIELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols)

U.S. : 435/6, 7.1, 69.5, 93.21, 93.2, 320.1, 235.1; 514/44; 530/ 350, 381.7, 387.1, 387.3; 536/23.4, 23.5, 23.72

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched

Electronic data base consulted during the international search (name of data base and, where practicable, search terms used)
PubMed, CAPLUS, BIOSIS, MEDLINE < EMBASE, SCISEARCH

C. DOCUMENTS CONSIDERED TO BE RELEVANT

| Category * | Citation of document, with indication, where appropriate, of the relevant passages | Relevant to claim No. |
|------------|---|-----------------------|
| X | US 5,985,655 A (ANDERSON et al.) 16 November 1999 (16.11.1999), abstract; columns 1-2; column 5, lines 18-25; column 6, lines 46-65 | 1-4, 6, 24-27, 29 |
| --- | | ----- |
| Y | | 1-4, 24-34 |
| Y | US 5,736,387 A (PAUL et al.) 07 April 1998 (07.04.1998), abstract; columns 1-4; col. 26, lines 36-57. | 1-6, 24-34 |
| Y | KASHAHARA et al., Science, November 1994, Vol 266, No. 5189, pages 1373-1376. | 1-6, 24-34 |
| Y | US 6,133,027 A (YEE et al.) 17 October 2000 (17.10.2000), columns 1-2; col. 20, lines 9-26. | 1-6, 24-29 |
| Y | US 6,261,554 B (VALERIO et al.) 17 July 2001 (17.07.2001), abstract, columns 1-3, and 10-11. | 1-6, 24-29 |
| Y | FIELDING et al., Blood, March 1998, Vol 91, No 5, pages 1802-1809. | 1-6, 24-34 |
| Y | CWIRLA et al., Science, June 1997, Vol. 276 No 5319, pages 1696-99. | 1-6 |

☒ Further documents are listed in the continuation of Box C.

☐ See patent family annex.

| | |
|---|--|
| * Special categories of cited documents: | "T" later document published after the international filing date or priority date and not in conflict with the application but cited to understand the principle or theory underlying the invention |
| "A" document defining the general state of the art which is not considered to be of particular relevance | "X" document of particular relevance; the claimed invention cannot be considered novel or cannot be considered to involve an inventive step when the document is taken alone |
| "E" earlier application or patent published on or after the international filing date | "Y" document of particular relevance; the claimed invention cannot be considered to involve an inventive step when the document is combined with one or more other such documents, such combination being obvious to a person skilled in the art |
| "L" document which may throw doubts on priority claim(s) or which is cited to establish the publication date of another citation or other special reason (as specified) | "&" document member of the same patent family |
| "O" document referring to an oral disclosure, use, exhibition or other means | |
| "P" document published prior to the international filing date but later than the priority date claimed | |

Date of the actual completion of the international search

29 October 2003 (29.10.2003)

Date of mailing of the international search report

21 JUN 2004

Name and mailing address of the ISA/US

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Authorized officer

Zachariah Lucas

Telephone No. 703-308-0196

INTERNATIONAL SEARCH REPORT

PCT/US03/07323

C. (Continuation) DOCUMENTS CONSIDERED TO BE RELEVANT

| Category * | Citation of document, with indication, where appropriate, of the relevant passages | Relevant to claim No. |
|------------|---|-----------------------|
| Y | FERNANDEZ et al., Journal of Virology, January 2002, Vol 76, No 2, pages 895-904. | 1-6, 24-34 |
| A | SCHNIERLE et al., Gene Therapy. April 1996. Vol 3, No. 4, pages 334-42. | 1-6, 24-34 |
| A | MAURICE et al., Blood, July 1999, Vol 94 , No 2, pages 401-410, esp. pages 407-410. | 1-6, 24-29 |

Form PCT/ISA/210 (second sheet) (July 1998)

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INTERNATIONAL SEARCH REPORT

PCT/US03/0732

BOX II. OBSERVATIONS WHERE UNITY OF INVENTION IS LACKING

This application contains the following inventions or groups of inventions which are not so linked as to form a single general inventive concept under PCT Rule 13.1. In order for all inventions to be examined, the appropriate additional examination fees must be paid.

Group I, claim(s) 1-6, and 24-34, drawn to chimeric retrovirus envelope proteins, compositions thereof, and a method of using the composition, wherein the heterologous short peptide ligand is a RGD ligand.

Group II, claim(s) 1-6, and 24-34, drawn to chimeric retrovirus envelope proteins, compositions thereof, and a method of using the composition, wherein the heterologous short peptide ligand is either a HRG or a GRP ligand.

Group III, claim(s) 7-12, drawn to nucleic acids encoding a chimeric envelope protein of a retrovirus.

Group IV, claim(s) 13-16, drawn to methods of altering retroviral tropism.

Group V, claim(s) 17-23, drawn to methods of identifying nucleic acid sequences encoding a chimeric envelope protein.

As indicated below, if the Applicant elects either Group II or Group III to be searched in addition to the invention of Group I, the Applicant must also elect one of the following sub-inventions.

For Group II above, election is also required to one of the following inventions: the protein wherein the heterologous short peptide ligand is A) a HRG ligand, or B) a GRP ligand.

For Group III above, election is also required to one of the following inventions: the nucleic acid wherein the heterologous short peptide ligand is A) a RGD ligand, B) a HRG ligand, or C) a GRP ligand.

The inventions listed as Groups I and II, as subgroups A) and B) to Group II, or subgroups A)-C) of group III do not relate to a single general inventive concept under PCT Rule 13.1 because, under PCT Rule 13.2, they lack the same or corresponding special technical features for the following reasons: each of these inventions relates to a chimeric retroviral envelope protein, or a nucleic acid encoding such, wherein the heterologous ligand has a different structure, and a different binding affinity (thereby performing a different function). The common technical feature among the inventions is the chimeric envelope protein. However, this feature is known in the art as demonstrated by Kasahara et al. (Science Volume 266 No 5189, pages 1373-76 (1994)). Because the common feature is known, there is no common special technical feature, and therefore no unity of invention.

The inventions listed as Groups I-III do not relate to a single general inventive concept under PCT Rule 13.1 with the inventions of Groups IV and V because, under PCT Rule 13.2, they lack the same or corresponding special technical features for the following reasons: the methods of Groups IV and V do not share a common special technical feature with the products of the other Groups because they are not methods of making or using those products. Thus, there is no common special technical feature, and therefore, unity of invention is lacking.

NOTES TO FORM PCT/ISA/220

These Notes are intended to give the basic instructions concerning the filing of amendments under Article 19. The Notes are based on the requirements of the Patent Cooperation Treaty, the Regulations and the Administrative Instructions under that Treaty. In case of discrepancy between these Notes and those requirements, the latter are applicable. For more detailed information, see also the *PCT Applicant's Guide*, a publication of WIPO.

In these Notes, "Article," "Rule" and "Section" refer to the provisions of the PCT, the PCT Regulations and the PCT Administrative Instructions, respectively.

INSTRUCTIONS CONCERNING AMENDMENTS UNDER ARTICLE 19

The applicant has, after having received the international search report, one opportunity to amend the claims of the international application. It should however be emphasized that, since all parts of the international application (claims, description and drawings) may be amended during the international preliminary examination procedure, there is usually no need to file amendments of the claims under Article 19 except where, e.g. the applicant wants the latter to be published for the purposes of provisional protection or has another reason for amending the claims before international publication. Furthermore, it should be emphasized that provisional protection is available in some States only.

What parts of the international application may be amended ?

Under Article 19, only the claims may be amended.

During the international phase, the claims may also be amended (or further amended) under Article 34 before the International Preliminary Examining Authority. The description and drawings may only be amended under Article 34 before the International Preliminary Examining Authority.

Upon entry into the national phase, all parts of the international application may be amended under Article 28 or, where applicable, Article 41.

When ? Within 2 months from the date of transmittal of the international search report or 16 months from the priority date, whichever time limit expires later. It should be noted, however, that the amendments will be considered as having been received on time if they are received by the International Bureau after the expiration of the applicable time limit but before the completion of the technical preparations for international publication (Rule 46.1).

Where not to file the amendments ?

The amendments may only be filed with the International Bureau and not with the receiving Office or the International Searching Authority (Rule 46.2).

Where a demand for international preliminary examination has been/is filed, see below.

How ? Either by cancelling one or more entire claims, by adding one or more new claims or by amending the text of one or more of the claims as filed.

A replacement sheet must be submitted for each sheet of the claims which, on account of an amendment or amendments, differs from the sheet originally filed.

All the claims appearing on a replacement sheet must be numbered in Arabic numerals. Where a claim is cancelled, no renumbering of the other claims is required. In all cases where claims are renumbered, they must be renumbered consecutively (Administrative Instructions, Section 205(b)).

The amendments must be made in the language in which the international application is to be published.

What documents must/may accompany the amendments ?

Letter (Section 205(b)):

The amendments must be submitted with a letter.

The letter will not be published with the international application and the amended claims. It should not be confused with the "Statement under Article 19(1)" (see below, under "Statement under Article 19(1)").

The letter must be in English or French, at the choice of the applicant. However, if the language of the international application is English, the letter must be in English; if the language of the international application is French, the letter must be in French.